

Work Order ID 151952

Friday, October 14, 2016 1:55:56 PM

151952

Page 1

Item ID: D6104-007 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: Stop ***NS2***
Item Name: Round Billet, 17-4
Start Date: 11/15/2016 Start Qty: 10.00 ***10*** Cust Item ID:
Required Date: 11/29/2016 Req'd Qty: 10.00 ***10*** Customer:
Reference:

Approvals: Process Plan: DAS 21 Date: OCT 17 2016 Tooling: _____ Date: _____ Run Start ***NR1***
QC: 9-89 Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D6104	Rev B								

100 PURCHASING 0.00 ***100*** 10 OCT 20 2016 DAS 13 9-89
Purchasing Memo 0.00
Purchasing

Issue P/O: 34012
a) Description: S.S round billet
b) Ø4.50" x 5.10" long
c) Tolerance on all dimensions are +0.030"/-0.000"
d) Material: 17-4PH Stainless steel (Ams 5643 or Aisi 630)
e) One blank makes 2 parts
f) Material certification required

110 Receive & Inspect for Damage & Mat'l Certs 0.00 ***110***

Packaging Memo 0.03
Packaging Ensure material certification is attached

10x SP16-10-26

Work Order ID 151952

Friday, October 14, 2016 1:55:56 PM

151952

Page 2

Item ID: D6104-007 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: Stop ***NS2***
Item Name: Round Billet, 17-4
Start Date: 11/15/2016 Start Qty: 10.00 ***10*** Cust Item ID:
Required Date: 11/29/2016 Req'd Qty: 10.00 ***10*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120 *120* QC Quality Control	QC18 In-Coming Inspection Material Memo Ensure Material certification comply to Dwg D6104	0.00 0.00				10	0		7/16/10/26
130 *130* Packaging Packaging	Identify as per dwg & Stock Location: <u>MADT043</u> Memo	0.00 0.02				10	0		7/16/10/26
140 *140* QC Quality Control	QC21- Final Inspection - Work Order Release Memo	0.00 0.17							

DAS
21
9-89

OCT 27 2016

DAS
21
9-89

OCT 27 2016

Picklist Print

Friday, October 14, 2016 1:55:55 PM

Page 1

Work Order ID: 151952

151952

Parent Item: D6104-007

D6104-007

Parent Item Name: Round Billet, 17-4

Start Date: 11/15/2016

Required Date: 11/29/2016

Start Qty: 10.00

Required Qty: 10.00

Comments: IPP A: 01.05.08New Issue EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6104-007P		Purchased	No			110	Each	0.0000	1	10			

D6104-007P

17-4 SS Roundbar 4.50"Od

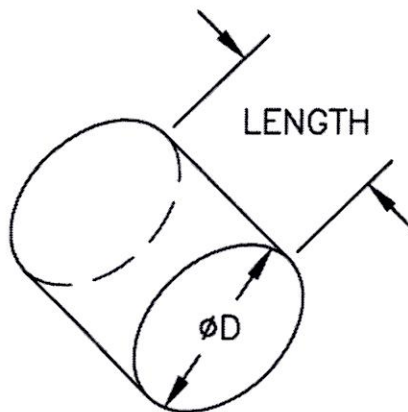
10X SP/6-10-24



DESIGN RT	DRAWN BY [Signature]	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED [Signature]	APPROVED [Signature]	DRAWING NO. D6104	Rev. B SHEET 1 OF 1
DATE 02.11.25		TITLE ROUND BILLET, 17-4	SCALE NTS
A	01.04.10	NEW ISSUE	
B	02.11.25	CLARIFY ALLOY SPEC ADDED D6104-009/-011 REDUCE LENGTH OF BILLETS	

RELEASED
02.11.29 [Signature]

SPECIFICATION CONTROL DRAWING



SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 151952 MJS
16-10-17

MATERIAL: 17-4 PH SS (AMS 5643 OR AISI 630) MIN UTS = 170 KSI (38 HRC)

PURCHASE MATERIAL ACCORDING TO THE FOLLOWING TABLE. SPECIFY ALLOY, DIAMETER x LENGTH (+0.030/-0.000) AS SHOWN.

TOLERANCE ON ALL DIMENSIONS IS +0.030/-0.000.

ALL DIMENSIONS ARE IN INCHES

Part No.	Alloy	D (Diameter)	Length
D6104-001	17-4 PH STAINLESS STEEL	Ø3.00	3.80
D6104-003	17-4 PH STAINLESS STEEL	Ø3.25	3.80
D6104-005	17-4 PH STAINLESS STEEL	Ø4.00	5.10
D6104-007	17-4 PH STAINLESS STEEL	Ø4.50	5.10
D6104-009	17-4 PH STAINLESS STEEL	Ø5.25	4.10
D6104-011	17-4 PH STAINLESS STEEL	Ø6.50	4.10

Copyright © 2001 by DART AEROSPACE LTD

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID PO34012

Purchase Order Date 10/20/2016

PO Print Date 10/20/2016

Page Number 1 of 2

Order From :

VU-MET002

METAUX CASTLE
P.O. BOX 4090 STN A
TORONTO, ONTARIO M5W OE9
CANADA

Ship To : DART AEROSPACE LTD

1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

E-MAILED
OCT 21 2016

Contact Name

Vendor Phone

Ship To Contact

Ship To Phone

Ship Via: Yours ppd

Ship Acct:

Buyer

Chantal Lavoie

Customer POID

Customer Tax #

10127-2607

Terms

Net 30

Currency

USD

FOB

Destination-Collect

Line Nbr	Reference Vendor Part Number	Description/ Mfg ID	Req Date/ Taxable	CD	Req Qty/ Unit of Measure	PO Unit Price	Extende Pric
Line Comments		Promise Date					
Delivery Comments							
1	D6104-007P	17-4 SS Roundbar 4.50"Od	11/14/2016		10.00	\$68.53	\$685.3
			Yes		Each		
			11/14/2016				
AS PER DWG D6104 REV. B							
B151952							
MATERIAL: 17-4 PH AS PER AMS 4643 OR AISI 630							
SIZE: 4.50" X 5.10" LONG							
						Line Total:	\$685.3
2	D6104-011P	17-4 SS Roundbar 6.50"Od	11/14/2016		10.00	\$115.00	\$1,150.0
			Yes		Each		
			11/14/2016				
AS PER DWG D6104 REV. B							
B151924							
MATERIAL: 17-4 PH SIZE: 6.50" X 4.100" LONG							
						Line Total:	\$1,150.0

Note:

10/20/2016

**Castle Metals®**

A. M. Castle & Co.

PACKING SLIP/
CERTIFICATE OF CONFORMANCE

Page 1 of 2

Shipment No:3109803

Ship From: A. M. CASTLE & CO. 2150 ARGENTIA ROAD MISSISSAUGA, ON L5N 2K7 CAN		Sold To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA		Ship To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CAN		Deliver To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA	
Date Shipped 25-OCT-16	F.O.B. ORIGIN	Freight Terms Prepaid		Carrier MANITOULIN		BOL No 3109803-2	

Shipment Details	Final Destination Branch - TOR
-------------------------	---------------------------------------

Order No	Line No	Item No	Description				
4539996	1	14998.MO	4.5000.RD.17CR-4NI.STAINLESS.RT.SOL TR.COND A.132.0000-156.0000 CUT TO 5.1 IN (+ .1250/- .0000 IN) - BAND SAW CUTTING SPECIFICATIONS: AMS 5643 ALL PAPERWORK MUST FOLLOW ORDER / CUSTOMER MUST RECEIVE AT TIME OF DELIVERY ALL MATERIAL MUST HAVE IDENTIFYING MARKINGS EX:HEAT #S Email P/s and certs to: clavoie@dartaero.com				
Purchase Order No		Part Number		Ordered Qty		Invoice Qty	
34012		YOUR ITEM NUMBER: D6104-007		10.00 PCS		10.00 PCS	
Details		ALL PAPERWORK MUST FOLLOW ORDER / CUSTOMER MUST RECEIVE AT TIME OF DELIVERY ALL MATERIAL MUST HAVE IDENTIFYING MARKINGS EX:HEAT #S Email P/s and certs to: clavoie@dartaero.com END USER: DART AEROSPACE END USE: COMMERCIAL AIRCRAFT PARTS					
Delivery No.	Mill	Heat Number	Mech Id	PCS	Width (IN)	Length (IN)	Shipped Qty(LBS)
120624632				5			118.2132

These commodities, technology or software were exported from the United States in accordance with the Export Administration Regulations. Diversion contrary to US law prohibited.
Date Printed: 25-OCT-2016 03:33:24 PM



Castle Metals®

A. M. Castle & Co.

PACKING SLIP/
CERTIFICATE OF CONFORMANCE

Page 2 of 2

120624632				5			118.2132
-----------	--	---	--	---	--	--	----------

These commodities/technologies are subject to US Export Administration & US State Dept. Regulations and, if intended for export, were/are exported thereunder. Diversion contrary to US Law is Prohibited.

We hereby certify the material covered by this certification conforms in accordance with the above specifications and has been found to meet the applicable requirements for the material, including any specifications forming a part of the description. Test reports are on file subject to examination. All claims for defective material are waived unless made in writing to A.M. Castle & Co. within 60 days of the shipment. Material cut to the correct size, or material cut by the customer cannot be returned for credit.

Reviewed by Authorized Castle Metals Representative:

Date:

Name: *[Signature]*

SP16-10-26.



North American Stainless Canada Inc.
740 Imperial Road North
Guelph, ON N1K1Z3
Canada

METALLURGICAL TEST REPORT

6870 Highway 42 East
Ghent, KY 41045-9615
(502) 347-6000

Certificate: 205665 1 Mail To:
Customer: 007209 001 CASTLE METALS
2150 ARGENTIA ROAD
MISSISSAUGA, ON L5N 2K7

Ship To:
CASTLE METALS
2150 ARGENTIA ROAD
MISSISSAUGA, ON L5N 2K7

Date: 8/04/2016 Page: 1

Steel: 630(17-4)

Finish: HR

Corrosion:

Red Ratio: 3.7 :1

Your Order: 32602

NAS Order: PN 0066689 01

PRODUCT DESCRIPTION:

Round Bar, Hot Rolled, Annealed, Rough Turned
UNS S17400; EN 10204 3.1, ASTM A484/15, MACRO OK, AMS 5643T
ASTM A564/13, AMS 2303F, ASME SA564-07, ASTM F899/11
SOL. ANNEALED @ 1900F MIN FOR 1 HR MIN. and air cooled to RT
UT per API6A PSL3, ASTM A388-S1 criteria, UT passed
H900 MECH. PROPERTIES ARE CAPABILITY ONLY*

REMARKS:

COMPLIES W/REQUIREMENTS OF DFAR 252.225-7009 EU DIRECTIVE
2011/65/EU. RoHS. EAF+AOD+CC. NO WELD REPAIR. MELTED AND MFG
IN USA FREE FROM MERCURY AND LOW MELTING ALLOY CONTAMINATION

DAS
14
9-89

16/10/26



Product Id	Skid #	Diameter	Size	Weight	-----Length-----	Mark	Pieces	Commodity Code
BI1090 8		4.5000		1.994	144.00	1	1	

Lab Accreditation Bureau, ISO/IEC 17025, Certificate# L2323

CHEMICAL ANALYSIS

CN(Country of Melt) ES(Spain) US(United States) ZA(South Africa) JP(Japan)

Chemical Analysis per ASTM A751/14a

HEAT	CM	C %	CB %	CO %	CR %	CU %	MN %	MO %	N %	NI %
031Y	US	.0443	.3090	.1075	15.3035	3.1495	.8570	.1885	.0304	4.1720
	P %	S %	SI %	TA %	TI %					
	.0245	.0255	.5615	.0125	.0020					

MECHANICAL PROPERTIES

Product Id	1 d o i c r	HB No.	Grain No.	Ferrite %	TS-900CAP KSI	YS-900CAP KSI	El-900CAP % 4D	RA-900CAP %	RC-900CAP No.	FREQ. No.
BI1090 8	R L	363.0	7.0	.20	195.75	172.23	11.70	42.48	42.0	.31

NAS hereby certifies that the analysis on this certification is correct. Based upon the results and the accuracy of the test methods used, the material meets the specifications stated. These results relate only to the items tested and this report cannot be reproduced, except in its entirety, without the written approval of NAS.

Technical
Dept. Mgr.

KRIS LARK

8/04/2016



North American Stainless Canada Inc.
740 Imperial Road North
Guelph, ON N1K1Z3
Canada

METALLURGICAL TEST REPORT

6870 Highway 42 East
Ghent, KY 41045-9615
(502) 347-6000

Certificate: 205665 1
Customer: 007209 001
Mail To:
CASTLE METALS
2150 ARGENTIA ROAD
MISSISSAUGA, ON L5N 2K7

Ship To:
CASTLE METALS
2150 ARGENTIA ROAD
MISSISSAUGA, ON L5N 2K7

Date: 8/04/2016 Page: 2

Steel: 630(17-4)

Finish: HR

Corrosion:

Red Ratio: 3.7 :1

Your Order: 32602

NAS Order: PN 0066689 01

PRODUCT DESCRIPTION:

Round Bar, Hot Rolled, Annealed, Rough Turned
UNS S17400; EN 10204 3.1, ASTM A484/15, MACRO OK, AMS 5643T
ASTM A564/13, AMS 2303F, ASME SA564-07, ASTM F899/11
SOL. ANNEALED @ 1900F MIN FOR 1 HR MIN. and air cooled to RT
UT per API6A PSL3, ASTM A388-S1 criteria, UT passed
H900 MECH. PROPERTIES ARE CAPABILITY ONLY*

REMARKS:

COMPLIES W/REQUIREMENTS OF DPAR 252.225-7009 EU DIRECTIVE
2011/65/EU. RoHS. EAF+AOD+CC. NO WELD REPAIR. MELTED AND MFG
IN USA FREE FROM MERCURY AND LOW MELTING ALLOY CONTAMINATION



Product Id	Skid #	Diameter	Size	Weight	-----Length-----	Mark	Pieces	Commodity Code
BI1090 8		4.5000		1.994	144.00	1	1	

Lab Accreditation Bureau, ISO/IEC 17025, Certificate# L2323

CHEMICAL ANALYSIS CM(Country of Melt) ES(Spain) US(United States) ZA(South Africa) JP(Japan) Chemical Analysis per ASTM A751/14a

MECHANICAL PROPERTIES

Product Id	1 d o i c r	SEV. No.
BI1090 8	R L	.16

NAS hereby certifies that the analysis on this certification is correct. Based upon the results and the accuracy of the test methods used, the material meets the specifications stated. These results relate only to the items tested and this report cannot be reproduced, except in its entirety, without the written approval of NAS.

Technical
Dept. Mgr.

KRIS LARK

8/04/2016

MATERIAL RECEIPT INSPECTION FORM

MATERIAL: DL104-007
 DATE: 16/10/26

PO / BATCH NO.: 34012/151952

MATERIAL CERT REC'D: 410
 QUANTITY RECEIVED: 10
 QUANTITY INSPECTED: 10
 QUANTITY REJECTED: _____

THICKNESS ORDERED: 4.50
 THICKNESS RECEIVED: 4.50
 SHEET SIZE ORDERED: _____
 SHEET SIZE RECEIVED: _____

DESCRIPTION	NCR (Check Y/N)		COMMENTS
SURFACE DAMAGE	Y	☒ N	
CORRECT FINISH	☒ Y	N	
CORROSION	Y	☒ N	
CORRECT GRAIN DIRECTION	☒ Y	N	
CORRECT MATERIAL	☒ Y	N	17-4 PH
CORRECT THICKNESS	☒ Y	N	4.500
PHOTO REQUIRED	Y	☒ N	
CORRECT MATERIAL	☒ Y	N	AMS 5643 AISI 630
CORRECT REF # TO LINK CERT	☒ Y	N	HEAT # 0314
CORRECT MATERIAL IDENTIFICATION	☒ Y	N	DL104-007
CORRECT M# ON THE MATERIAL	☒ Y	N	B151952
DOES THIS MATERIAL REQUIRE ENGINEERING SIGN OFF	Y	☒ N	
DOES THIS REQUIRE AN EXTRUSION REPORT	Y	☒ N	

CUT SAMPLE PIECE OF MATERIAL AND PERFORM A HARDNESS CHECK. RECORD RESULTS BELOW					
TYPE OF MATERIAL SIZE OF TEST SAMPLE HARDNESS / DUROMETER READING	HRC	HRB	DUR A	DUR D	

testers located in the Quality Office

QC 18 INSPECTION		ENGINEERING SIGNOFF (if required)	
INSPECTED BY: <u></u> DATE: <u>16/10/26</u>	SIGNED OFF BY: _____ DATE: _____		

Attach this inspection sheet with the corresponding material cert and remit to be scanned and received in

MATERIAL RECEIPT INSPECTION FORM

INSTRUCTIONS FOR INSPECTING BAR, TUBING, ROUND, & SHEET STOCK

- 1- VERIFY STOCK TO DART PURCHASE ORDER
- 2- MEASURE ALL DIMENSIONS FOR EACH PURCHASED STOCK
 - a. WIDTH, THICKNESS, DIAMETER, WALL THICKNESS & LENGTH
- 3- VERIFY CONDITION OF MATERIAL i.e. DAMAGED, CORRODED, etc.
- 4- VERIFY THAT SUPPLIER HAS A NUMBER (HEAT #) ON ITS RECEIVING REPORT TO LINK TO MATERIAL CERTS
- 5- VERIFY MATERIAL CERTS ARE CORRECT TO THE DART PO INSTRUCTIONS
- 6- REMOVE / CUT A PIECE OF MATERIAL FOR SAMPLE HARDNESS TESTING

INSTRUCTIONS FOR INSPECTING SKIDTUBE & STEP EXTRUSION

- 1- VERIFY TO DART SUPPLIED DRAWING
- 2- SAMPLE INSPECT MATERIAL IN BUNDLE TO ENSURE MATERIAL CAN BE RECEIVED INTO DART
- 3- USING PORTABLE HARDNESS TESTER VERIFY HARDNESS OF THE MATERIAL TO THE DRAWING
- 4- VERIFY THAT MATERIAL CERTS MATCH TO WHATS CALLED UP ON THE DART DRAWING

AFTER MATERIAL PASSES INSPECTION

- 5- HAVE DART EMPLOYEES START STOCKING MATERIAL BUT REQUEST MIN **20pcs** FOR FULL INSPECTION
- 6- INSPECT ALL DIMS AS PER DRAWING REQUIREMENTS

INSTRUCTIONS FOR INSPECTING CROSS TUBE MATERIAL

- 1- VERIFY MATERIAL CERTS MATCH THE REQUIREMENTS ON THE DART DRAWINGS
- 2- INSPECT MIN. HALF THE BATCH OF EXTRUSION RECEIVED INTO DART
- 3- INSPECT MATERIAL AS PER THE EXTRUSION REPORT
 - a. WALL THICKNESS USING ULTRA-SONIC IN 4 LOCATIONS
 - b. OUTSIDE DIAMETER HIGHEST/LOWEST BOTH ENDS
 - c. INSIDE DIAMETER HIGHEST/LOWEST BOTH ENDS
 - d. STRAIGHTNESS @ CENTER OVER 12" SPAN
 - e. WALL THICKNESS USING TUBE MICROMETER HIGHEST/LOWEST BOTH ENDS
- 4- IDENTIFY EACH TUBE IN SEQUENCE OF INSPECTING (TUBE 1, TUBE2.....) AND W/O# AND PO#
- 5- RECORD ALL FINDINGS ON EXTRUSION REPORT

IF ANY QUESTIONS PLEASE SEE QC COORDINATOR BEFORE GOING FURTHER